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Policies of United Nations system organizations towards the use of open source software for development

Note by the Secretary-General

The Secretary-General has the honour to transmit to the members of the General Assembly the report of the Joint Inspection Unit on policies of United Nations System Organizations towards the use of open source software for Development (JIU/REP/2005/7 and Corr.1).

* A/61/50 and Corr.1.

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POLICIES OF UNITED NATIONS SYSTEM ORGANIZATIONS TOWARDS THE USE OF OPEN SOURCE SOFTWARE (OSS) FOR DEVELOPMENT

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In accordance with Article 11.2 of the JIU Statute, this report has been "finalized after consultation among the Inspectors so as to test recommendations being made against the collective wisdom of the Unit".

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ABBREVIATIONS

AAU	Addis Ababa University
APDIP	Asia Pacific Development Information Programme
CCA/UNDAF	Common Country Assessment/ United Nations Development Assistance Framework
CD	compact disc
CEB	United Nations System Chief Executives Board for Coordination
CODI	Committee on Development Information (UCA)
CSO	civil society organization
DESA	United Nations Department for Economic and Social Affairs
DOI	Digital Opportunity Initiative
ECA	Economic Commission for Africa
EHR	electronic health records
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FOSS	free and open-source software
FOSSFA	Free and Open Source Foundation for Africa
FSF	Free Software Foundation
GNU	recursive acronym for "GNU's Not Unix"
GPL	general public licence
HHS	United States Department of Health and Human Services
HIV/AIDS	human immunodeficiency virus/acquired immunodeficiency syndrome
HP	Hewlett Packard
ICT	information and communication technologies
IDABC	Interoperable Delivery of pan-European e-government services to public Administrations, Businesses and Citizens
IICD	International Institute for Communications and Development
IOSN	International Open Source Network
ITU	International Telecommunication Union
IUCEA	Inter-University Council of East Africa
LDC	least developed countries
JIU	Joint Inspection Unit
MDGs	Millennium Development Goals
MIT	Massachusetts Institute of Technology
NEPAD	New Partnership for Africa's Development
NGO	non-governmental organization
NPO	non-profit organization
ODA	official development assistance
OECD	Organization for Economic Cooperation and Development
OSO	Open Source Observatory
OSS	open source software
PC	personal computer
PDF	portable document format
PRSP	Poverty Reduction Strategy Paper
RSIS	Regional Strategy on Information Society
SDNP	Sustainable Development Networking Programme
TCO	total cost of ownership
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNITAR	United Nations Institute for Training and Research
UNPAN	United Nations Online Network on Public Administration and Finance (DESA)
UNU	United Nations University
USAID	United States Agency for International Development
WFP	World Food Programme
WHO	World Health Organization
WSIS	World Summit on Information Society

Executive summary

OBJECTIVE

In the framework of using information and communication technologies (ICT) for development, to contribute in raising awareness on the potential role of open source software (OSS) for the achievement of specific objectives set in the Millennium Development Goals (MDGs) and the Plan of Action adopted in 2003 by the World Summit on the Information Society (WSIS).

Main findings and recommendations

A. There is a wide consensus that the use of ICT can foster the implementation of development goals in general and those of the Millennium Development Goals in particular. Indeed, the United Nations ICT Task Force has established linkages between most of the targets related to the MDGs and ICT targets. In that context, and as OSS has been recognized in many instances to be a valid alternative to corresponding proprietary software, such recognition should be reflected in Member States' ICT policies for development (chap. I, paras. 4-13).

RECOMMENDATION 1

In line with the relevant provisions of the 2003 World Summit on the Information Society (WSIS) Plan of Action related to the possibilities offered by different software models, including proprietary and open source software, the General Assembly should:

(a) Invite Member States to emphasize the role of ICT in achieving the MDGs and to better reflect in their MDG-oriented strategies, particularly in Poverty Reduction Strategy Papers (PRSPs) and the Common Country Assessment/United Nations Development Assistance Framework (CCA/UNDAF), their ICT requirements including by taking adequately into account the potential of OSS to foster competition and increase freedom of choice and affordability;

(b) Call on the Secretary-General and other executive heads of United Nations system organizations to provide, as appropriate, their full support to Member States opting to develop initiatives for using OSS to reach the Goals.

B. Many case studies attest that OSS can contribute to achieve development goals in many areas such as e-government, economic empowerment, education and health. However, an enabling environment is necessary for its increased use (chap. II, paras. 14-55).

RECOMMENDATION 2

The General Assembly should encourage Member States to adopt pro-poor policies to foster digital inclusion by:

(a) Promoting access to low-cost hardware and software including those based on OSS;

(b) Increasing awareness among decision-makers of the potential of OSS and the availability in many instances of tested and well supported OSS applications;

(c) Fostering capacity-building programmes and providing incentives for ongoing local OSS development and support.

C. Within their mission statements and in the framework of their development agenda (notably the MDGs), a number of United Nations system organizations are directly concerned by the potential of using OSS to support their development initiatives. While they are contributing to some extent to address the requirements for an enabling environment mentioned above, more should be done in that regard (chap. III, paras. 56-77).

RECOMMENDATION 3

The Secretary-General and other executive heads of United Nations system should consider taking as appropriate the following measures:

(a) Increase awareness through (i) a dedicated OSS portal; (ii) a dedicated portal on the MDGs or on ICT for development containing information and hyperlinks related to OSS; and (iii) improving the layout of current web sites so as to give better exposure to OSS initiatives relevant to the mandate of their organization;

(b) Develop software applications under OSS licences whenever possible and make them readily accessible online to various stakeholders;

(c) Provide support to Member States pro-poor policies geared at promoting digital inclusion through affordable access to hardware and software, including by making available low-cost computers and refurbished personal computers (PCs) running on OSS applications.

D. Goal 8 of the MDGs call for developing global partnerships to support development, and in that context, its targets include, inter alia (a) addressing the special needs of least-developed countries and those of landlocked and small island developing countries and making available, "in cooperation with the private sector," the benefits of new technologies, especially ICT; and (b) offering more generous official development assistance (ODA) for countries committed to poverty reduction. Besides a number of private sector enterprises which have found OSS to be an attractive business venture, the buoyant OSS community is mostly driven by grass-roots civil society organizations (CSO) and non-profit organizations (NPO) which should be better involved as role players at the different stages of project implementation (chap. IV, paras. 78-88).

RECOMMENDATION 4

In the framework of initiatives related to Goal 8 of the MDGs, the General Assembly should:

(a) Call on the donor community to include or maintain in its official development assistance programmes adequate funding for poverty reduction OSS-based projects;

(b) Request the Secretary-General, in his capacity as Chairman of the United Nations System Chief Executives Board for Coordination (CEB), to consider all appropriate steps that members of CEB could take to allow United Nations system organizations to better serve as catalysts for multi-stakeholder partnerships involving different OSS role players, including private sector enterprises and civil society organizations.

INTRODUCTION

Background

1. This report is the second of a two-part review undertaken by the Joint Inspection Unit (JIU) on the policies of United Nations system organizations regarding the use of OSS, a term equated with "free software", also called "free and open source software" (FOSS) although there is a fine distinction between these expressions. Detailed definitions of OSS and "free software" are available respectively on the web sites of the Open Source Initiative[1] and the Free Software Foundation (FSF)[2] and the latter also provides a simplified definition of "free software".[3] The first report (JIU/REP/2005/3)[4] aimed at raising awareness on the potential benefits of OSS by examining software policies in the secretariats against the background of a growing trend worldwide among Member States promoting the use of OSS in their own public administrations. As OSS applications have been recognized in many instances to be valid alternatives to corresponding proprietary or closed source software, the report recommended inter alia that (a) Member States and other stakeholders should not be obliged to choose a particular type of software in order to exercise their right to access information, (b) United Nations system organizations should seek to foster the interoperability of their diverse systems and they should require adherence to a policy of open standards and open content for public documents and records, and (c) secretariats should agree on a common United Nations Interoperability Framework to guide future ICT investments.

Focus and methodology

2. The main focus of this second report is to examine the extent to which, in the wider framework of applying ICT for development, the use of OSS can foster the achievement of some of the Millennium Development Goals.[5] Chapter I deals with the justifications for using OSS for development by establishing the linkages between ICT, the MDGs and OSS. Chapter II highlights some of the areas in which OSS has been used to achieve development targets. Chapter III provides an overview of some activities undertaken by selected United Nations system organizations in promoting the use of OSS. Finally, chapter IV reviews a few cases where OSS was used in the framework of development assistance programmes or in the context of multi-stakeholder partnerships.

3. Besides views and comments from different stakeholders and replies to a questionnaire received from the secretariats, additional and useful information was retrieved from different web sites for which the relevant hyperlinks have been indicated under footnotes. While such links were still valid when initially accessed, they may have been moved or deleted thereafter. The Inspector wishes to extend his appreciation and thanks to all those who assisted him in the preparation of this report.

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[1] See http://www.opensource.org/docs/definition.php

[2] See http://www.gnu.org/philosophy/free-sw.html

[3] The simplified definition states: "free software is software that comes with permission for anyone to use, copy and distribute either verbatim or with modifications, either gratis or for a fee. In particular this means that source code must be available" (see http://www.gnu.org/philosophy/categories.html).

[4] "Policies of United Nations system organizations towards the use of open source software (OSS) in the secretariats" to be issued as a General Assembly document.

[5] See http://www.un.org/millenniumgoals/

CHAPTER I. OPEN SOURCE SOFTWARE FOR DEVELOPMENT: WHY?

A. Linkages between information and communication technologies, the Millennium Development Goals and open-source software

4. At the annual G8 Summit held in Okinawa, Japan, in July 2000, the leaders of eight major industrialized countries and the President of the European Commission recognized the role of ICT in empowering individuals, boosting economies, promoting stronger social cohesion and they decided that the "access to digital opportunities must be open to all". They also committed their countries to set up a Digital Opportunities Task Force, with an advisory role on "global action to bridge the international information and knowledge divide".[1] During the Summit, Accenture,[2] the Markle Foundation[3] and the United Nations Development Programme (UNDP)[4] formed a public-private partnership to launch the Digital Opportunity Initiative (DOI). In its final report issued in July 2001,[5] the DOI sought to demonstrate that "ICT can be a powerful tool for development, both because of ICT' inherent characteristics and the mounting empirical evidence that suggests it can in fact contribute a great deal to development goals", while cautioning that "ICT is not a panacea for the developing world's problems".[6]

5. Several reviews and analyses arrived at similar conclusions. Concerning more specifically the linkages between ICT and the MDGs, the United Nations ICT Task Force developed a comprehensive conceptual framework underlining the role played by ICT in the overall development agenda and mapping ICT goals against each of the eight Millennium Development Goals.[7] In that context, and wherever the use of ICT implies the use of software, OSS appears not only to be a valid alternative to proprietary software, but in some cases it is the most affordable in terms of access and total cost of ownership (TCO). Annex 1 lists eight of the MDGs and some related ICT targets for which OSS could be applied.

B. Rationale and potential benefits of using open source software for development

6. Access to information is a prerequisite for many of the ICT goals linked to the achievement of the MDGs. As noted in a report published under the auspices of the World Bank, "ICTs provide access to information that can create earnings opportunities, improve access to basic services, or increase the impact of education and health interventions. ICTs also give the poor a medium through which to demand government support and reforms. Recent advances in ICT can also provide people who have sensory disabilities with a means by which to access information and communicate efficiently with the rest of society".[8] If citizens have indeed the right to access information and to demand better accountability from governments, a fundamental issue to address is to ensure that no one should be obliged to acquire for a fee a particular type of software in order exercise such right.

7. On the eve of the 2005 World Summit held in New York, the United Nations Department of Economic and Social Affairs (DESA) hosted a Global Roundtable Forum on innovation[9] attended by several Heads of State or Government. The Forum focused on the crucial role of science, technology and innovation, especially ICT, for achieving the MDGs. As previously emphasized in the *Human Development Report, 2001* published by UNDP, "[n]o country will reap the benefits of the network age by waiting for them to fall out of the sky" and "[T]oday's technological transformations hinge on each country's ability to unleash the creativity of its people, enabling them to understand and master technology, to innovate and to adapt technology to their own needs and opportunities".[10] For developing countries, OSS can be an important source of innovation by fostering the realization of value, either economic or social, through the introduction of new ways of doing things. In particular, by providing a low-barrier entry to software development, OSS

[1] "Okinawa G-8 Summit Communiqué", 22 July 2000, http://www.g8.gr.jp/summit/docs/g8_okinawa_communique.htm.

[2] http://www.accenture.com/Global/Research_and_Insights/Outlook/Digital_Opportunity_Initiative.htm.

[3] http://www.markle.org/.

[4] http://www.undp.org/.

[5] "Creating a Development Dynamic: Final Report of the Digital Opportunity Initiative", July 2001, http://www.gdnet.org/pdf/digitalopportunity_publication.pdf.

[6] Ibid., page 2-3.

[7] "Tools for Development: Using Information and Communications Technology to Achieve the Millennium Development Goals", http://www.unicttaskforce.org/perl/documents.pl?id_type=2&id_topic=1&id_subtopic=36.

[8] Charles Kenny, Uma Suman Subraveti, and Christine Qiang, "Information and communication technologies", http://rru.worldbank.org/Documents/PolicyNotes/ICT-Growth.pdf.

[9] "Innovation and investment: scaling science and technology to meet the Millennium Development Goals", http://www.un.org/esa/coordination/ecosoc/globalroundtable2005.htm.

[10] United Nations Report 2001, page 4, p. 78 and http://hdr.undp.org/reports/global/2001/en/.

allows countries to innovate in two ways: first, by creating a thriving ICT industry to supply OSS-based software applications and content, and/or second, by developing customized and localized applications and content that are better able to meet local needs and requirements.

8. The previous JIU report on the use of OSS (JIU/REP/2005/3) recalled that the benefits associated with the use of OSS have been detailed in one of the e-primers on FOSS[16] published by the UNDP Asia-Pacific Development Information Programme (APDIP) and were categorized as "strategic benefits" (developing local capacity/industry, reducing imports/conserving foreign exchange, enhancing national security and reducing copyright infringements), "economic benefits" (increasing competition, reducing TCO, enhancing security and achieving vendor independence) and "social benefits" (increasing access to information).[17] Although proponents of proprietary software have questioned the validity of some of these benefits, there is more than anecdotal evidence that, in varying degrees, expectations from such benefits often served as the main drivers for the decision by a growing number of Governments to adopt an OSS policy within their e-government strategies. To cite only a few, countries such as Brazil, China, Malaysia, South Africa or Viet Nam are determined to take advantage of OSS to develop a local IT industry. The argument of cost savings has been highlighted in most of the cases where Governments have adopted a policy promoting or imposing the use of OSS in public administrations. Brazil alone is said to be able to save US$ 120 million per year in that regard solely for government operations.[18]

9. For better impact on target audiences, it is also essential to provide information in local languages besides the international languages mostly prevalent on the Internet. It is estimated that more than 90 per cent of the content on the Internet exists in only 12 languages while there are some 6,000 languages spoken worldwide according to the United Nations Educational, Scientific and Cultural Organization's (UNESCO) "Atlas of languages in danger of disappearing".[19] Among these, more than 3000 languages are considered to be spoken by fewer than 10,000 people and about one fifth of the world's languages exist only in oral form. Providing universal access to the benefits of the ICT revolution and bridging the knowledge divide would require therefore that issues related to local content and to multilingualism in cyberspace be more properly addressed. Indeed, the General Conference of UNESCO adopted in October 2003 a "Recommendation concerning the promotion and use of multilingualism and universal access to cyberspace"[20] in which it states inter alia that "Member States and international organizations should encourage and support capacity-building for the production of local and indigenous content on the Internet."[21] The Initiative *B@bel* launched by UNESCO aims precisely at using ICT to support linguistic and cultural diversity as well as to promote multilingualism on the Internet. Given the main features of OSS (freedom of access to the source code, to modify/adapt the software to users' needs and to redistribute with or without a fee), communities of developers can more easily make available localized versions of software in a larger number of languages. For instance, Ubuntu[22], a Linux-based OSS is supported in 90 languages, from Afrikaans and Amharic to Yoruba and Zulu.

C. Open source software and e-strategies

10. In a document[23] submitted to POVNET[24] – the Development Assistance Committee's Network on poverty reduction of the Organisation for Economic Cooperation and Development (OECD) – the case has been made that there are important structural weaknesses in ICT policy-making in most developing countries, particularly the least developed countries (LDCs). Such weaknesses include inter alia (a) a "lack of awareness of the potential of ICTs in all decision-making strata of government, particularly the topmost layers;" and (b) a "lack of integration of ICT policy-making with other areas of government, in particular with Ministries of Finance and ministries responsible for development priorities".[25] The document further noted that "National ICT strategies are often designed by those who are strongly committed to the role of

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[16] Kenneth Wong. "Free/open source software: Government policy" (see http://www.iosn.net/government/foss-government-primer/foss-govt-policy.pdf).
[17] JIU/REP/2005/3, para. 29.
[18] See http://news.bbc.co.uk/1/hi/business/4602525.stm.
[19] See http://portal.unesco.org/ci/en/ev.php-URL_ID=16540&URL_DO=DO_TOPIC&URL_SECTION=201.html.
[20] See http://portal.unesco.org/ci/en/file_download.php/41e32bf91e3d30e7855eefe4251eba6fRecommendation-Eng.pdf.
[21] See ibid., para. 2.
[22] See http://www.ubuntu.com.
[23] David Souter, "ICTs and economic growth in developing countries" (see http://www.oecd.org/dataoecd/15/54/34663175.pdf).
[24] See http://webdomino1.oecd.org/COMNET/DCD/PovNet.nsf.
[25] See http://www.oecd.org/dataoecd/15/54/34663175.pdf, para. 55.

ICTs, with insufficient participation by mainstream sectoral development planners and insufficient integration into national development strategies such as those set out in PRSPs".[26]

11. During the last Asian Forum on ICT policies and e-strategies organized by APDIP (Kuala Lumpur, 20-22 October 2003),[27] a round table dealt with the linkages between ICT, the PRSPs and the MDGs. It was considered that "strategies need to integrate ICT into development plans or PRSPs, as very few nations have done so. In addition, the integration of ICT within PRSPs would assist donor agencies to be aware of national macro and sectoral policies coordinated for poverty alleviation".[28] An informal experts meeting on ICT for poverty reduction, held at OECD in July 2004, reached similar conclusions. From an analysis of how ICT are treated in the 34 PRSPs submitted as of January 2004,[29] it appeared that only 13 countries had included ICT as an independent strategic component for poverty reduction in their PRSP. A later study by UNDP-APDIP found out however some progress in the Asia-Pacific region.[30]

12. The above ICT policy environment has a bearing on the importance given to software in general and OSS in particular by concerned Member States in devising their e-strategies and their PRSP. General Assembly resolution 57/295 of 20 December 2002 affirmed "the need to use information and communication technologies as a strategic tool to enhance the efficiency, effectiveness and impact of the development programmes and technical cooperation activities of the United Nations system". In that regard, the Inspector notes that, at its Fourth Meeting (23-28 April 2005, Addis Ababa), the Committee on Development Information (CODI) of the United Nations Economic Commission for Africa (ECA) adopted a resolution on FOSS[31] recommending inter alia that Member States (a) "consider FOSS as a strategic option to strengthen the provision of cost-effective, easily adaptable and modifiable services to citizens"; (b) "take into account FOSS in the formulation and implementation of ICT industrialization initiatives"; (c) "introduce training programmes in the use of FOSS"; and (d) "ensure open standards and interoperability of computer operating systems which are now being considered part of infrastructure". In the same resolution, CODI recommended also that ECA should support Member States to develop their capacity in FOSS.

13. In line with the above considerations, it would be appropriate for all Member States concerned to take into account the potential of OSS in their e-strategies to be reflected in their PRSPs and CCA/UNDAF. For their part, secretariats of United Nations system organizations should provide, as appropriate, their full support to Member States in developing initiatives promoting the use of OSS for development (**recommendation 1**).

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[26] Ibid., para. 56.
[27] See http://www.apdip.net/projects/2003/asian-forum.
[28] See http://www.apdip.net/projects/2003/asian-forum/summary1.
[29] "Information and communication technologies (ICTs) in Poverty Reduction Strategy Papers (PRSPs) as of January 2004" (see http://www.oecd.org/dataoecd/15/55/34662767.pdf).
[30] "Do Governments actually believe that ICT can help alleviate poverty?" (see http://www.apdip.net/apdipenote/2.pdf).
[31] Resolution 4 of the Subcommittee on ICT Libraries (see http://www.uneca.org/codi/codi4/codi_iv_report.pdf).

CHAPTER II: OPEN SOURCE SOFTWARE FOR DEVELOPMENT: WHERE?

A. Open source software and e-governance

14. The subject of public administration and development has been on the agenda of the General Assembly for more than a decade. Its resolution 50/225 of 19 April 1996 recognized inter alia that "effectiveness of government requires an efficient and effective public administration in all countries that is responsive to the needs of the people, promotes social justice, ensures universal access to quality services and productive assets and creates an enabling environment for sustainable people-centred development".[32] More recently, the Assembly further recognized "the importance of strengthening public administration institutions, improving public sector human resources capacity and fostering knowledge creation and innovation and the utilization of information technology for development in public administration and in the implementation of internationally agreed development goals, including those contained in the United Nations Millennium Declaration".[33]

15. A handbook on e-government[34] jointly published by the World Bank Information for Development Program (infoDev) and the Center for Democracy and Technology (CDT) defined e-government as the use of ICT "to transform government by making it more accessible, effective and accountable". E-government is said to include: (a) "providing greater access to government information"; (b) "promoting civic engagement by enabling the public to interact with government officials"; (c) "making government more accountable by making its operations more transparent and thus reducing the opportunities for corruption"; and (d) "providing development opportunities, especially benefiting rural and traditionally underserved communities".[35] According to that publication, there are three phases of e-government: the publish phase, i.e. using ICT to expand access to government information, the interact phase, i.e. broadening civic participation in government, and the transact phase, i.e. making government services available online.

16. The *World Public Sector Report 2003*,[36] issued by DESA, deals with several aspects of e-government and details in particular the nomenclature of e-government as "Government-to-Government" (G2G). This involves sharing data and conducting electronic exchanges between governmental actors, "Government-to-Business" (G2B) involving business-specific transactions as well as online provision of business-focused services, and "Government-to-Consumer/Citizen" (G2C), involving initiatives designed to facilitate people's interaction with government as consumers of public services and as citizens.

17. For its part, and considering the scale, scope and potential of e-governance interventions under way, UNDP devoted one of its publications[37] to e-governance, highlighting in particular the lessons learned from its own current evaluative evidence and those of partner organizations on what works and what does not (Box 1). Based on emerging experience with ICT projects in private sector organizations in industrialized and developing countries, it would appear that while ICT projects can deliver significant benefits, only 25 per cent of large-scale ICT projects are found to be on target. The review underlines some of the conditions for success in e-governance initiatives, such as the need to adopt a pro-poor focus and to "closely align e-governance interventions with strategic development objectives as expressed in the MDGs and with specific national development priorities". Lessons learned include the acknowledgement that "the right mix of technologies can add flexibility, foster local adaptation and ensure competition and choice in the market for e-governance solutions". In that regard, UNDP considers that OSS "provides a particular advantage when dealing with important government-held information. The choice of open file formats ensures that long-term access to digital archives is guaranteed and does not depend on a single software proprietor or a decision on how long to support a specific file format in later product versions".

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[32] A/RES/50/225, seventh preambular paragraph.
[33] A/RES/59/55, fifth preambular paragraph.
[34] "The e-government handbook for developing countries" (see http://www.infodev.org/content/library/detail/843).
[35] Ibid., Introduction.
[36] *World Public Sector Report 2003: E-government at the Crossroads* (see http://unpan1.un.org/intradoc/groups/public/documents/un/unpan012733.pdf).
[37] Essentials No. 15, April 2004 (see http://www.undp.org/eo/documents/essentials/Ess-egov-essential-No-15.pdf).

Box 1

E-governance and lessons learned

Lessons learned

1. The benefits from e-governance are very diverse, often subtle and go beyond cost-saving and direct democratic participation.

2. The poor do not automatically benefit from e-governance initiatives.

3. E-governance can act as a catalyst for change only when there is political will, institutional support, and commitment from key stakeholders.

4. The right mix of technologies can add flexibility, foster local adaptation and ensure competition and choice in the market for e-governance solutions.

(Source: UNDP http://www.undp.org/eo/documents/essentials/En-egov-essential-No-15.pdf)

18. There are many case studies on the use of OSS in the framework of e-government. One of the most comprehensive concern: Extremadura. This is the poorest region of Spain, suffering from both economic and technological difficulties. The regional government anticipated that ICT could help overcome these obstacles. The Regional Strategy on Information Society (RSIS) was launched in 1997 with the objectives of providing accessibility for all to Internet as a public service, to stimulate technological literacy and to promote new models of business and a new labour culture. The RSIS represents an integrated approach covering e-governance, education, health and regional and local administration. It has two components, i.e. a Strategic Framework supported by a Technological Framework based on the Intranet and the LinEx project. LinEx includes the localised version of the GNU/Linux operating system and several office applications. It was installed on approximately 87,000 PCs, in secondary and primary schools, with a ratio of two students per PC. It was also implemented in the health care system and made widely available to the general public. The reasons for OSS implementation in Extremadura range form cost savings (estimated at a minimum cost of € 30 million (euros)), to adaptability, security and IPR compliance. Extremadura has been implementing recently the LinEx enterprises platform meant to promote the use of OSS in the private sector and to facilitate the transition to the e-Economy. A confirmation of the significant success of the Extremadura case is its replication by other Spanish regions[38] such as Andalusia, Castilla-La Mancha, the Community of Madrid, Cantabria and the Region of Valencia.

19. In Asia, the Malaysian state of Terengganu is collaborating with MIMOS - Malaysia's research and development organization specializing in ICT and Microelectronics - to implement an OSS ecosystem including software development industry, support, OSS community and the education sector. It is using a localized MIMOS GNU/Linux in its 32 ICT community centres known as Bestari.comm[39]. This programme will be extended to the state's government departments and agencies, as well as to schools.

20. At the municipal level, cases of cities opting for OSS abound and have been reported by different sources including the Open Source Observatory maintained by the European Union (EU) Commission.[40] One of the most often highlighted is the city of Munich, Germany, which opted to migrate 14,000 desktops to Linux. The Brazilian city of São Paulo is in the process of rolling out its municipal network of community telecentres equipped with OSS software.

B. Open source software and economic opportunity

21. The year 2005 has been declared International Year of Microcredit by the United Nations. As the Secretary-General has stated, "microfinance has proved its value, in many countries, as a weapon against poverty and hunger. It really can change peoples' lives for the better -- especially the lives of those who need it most".[41] In order to reach more people most in need of accessing credit, microlending schemes must find more cost-effective and efficient ICT tools. This is where using OSS can make a difference. According to press releases, a consortium of companies and NPOs led by Hewlett Packard released in June 2005 an OSS-

[38] See http://europa.eu.int/idabc/en/document/4327/469
[39] See www.bestari.com.my
[40] See http://europa.eu.int/idabc/en/chapter/452
[41] See http://www.un.org/events/microcredit/

based handheld hardware system – the Remote Transaction System – which will allow tracking loan information in remote areas.[42] The system was tested for six months in Uganda.

22. Another microfinance joint initiative[43] has been launched recently in Morocco by PlaNet Finance Maroc[44] and the Grameen Foundation USA.[45] It will leverage OSS tools. Positive results have been reported from tests made with the first release in seven of the microfinance institutions in Morocco. Once the technology and business model are validated, the programme will be released to other countries interested by a similar credit-tracking system.

23. AgriBazaar[46] is an e-market place developed by MIMOS using OSS technology across the entire application. It is a joint effort with Malaysian Department of Agriculture, which provides on-line opportunities for local producers to have fair market access for their agriculture produce. The portal is dynamic as the content is based on transactions made by members. In marketing their products, small local producers are usually subject to price manipulation by intermediaries, have limited access to markets and therefore obtain low farm gate prices. AgriBazaar aims to increase the productivity and competitiveness of the agriculture sector and to bridge the digital divide affecting local farmers. Its benefits include increased income to the farmers and rural communities through the on-line direct access to customers and suppliers, delivery of useful services to rural communities by using ICT innovating solutions as an empowerment tool to address issues specific to agricultural communities. Membership registration is free of charge and provides business tools for the on-line transactions to more than 6,000 members.

C. Open source software in the education sector

Rationale for using open source software

24. The rationale for using OSS in the education sector has been developed in many reviews from different sources or government-sponsored policy papers. International Open Source Network (IOSN) issued an e-primer on the subject[47] covering the use of FOSS from schools to university. It argues that "FOSS can play an important role in education, especially in developing countries" and identifies the main reasons as being reliability, performance and security, building long-term capacity, open philosophy, encouraging innovations, an alternative to illegal copying of proprietary software, possibility of localization and learning from source code, and, last but not least, lower costs.

25. Some proponents of OSS point out during interviews that the notions of "freedom", "equality" and "solidarity" cherished by the open source movement are precisely the first three values among those considered in the United Nations Millennium Declaration[48] to be fundamental values essential for international relations in the twenty-first century.

26. Instances where OSS is used for education, scientific research and development are frequent. Some policy makers started to embrace the idea of using OSS for a more efficient and effective educational process. The Inspector reviewed the following examples, which, without being exhaustive, give a picture of OSS relevance to the education field.

Examples of open source software usage in education in developed countries

27. A study[49] conducted in 2003 shows that there is an increasing interest in the potential applications of OSS in Australian schools (both private and public). The same interest can be observed in many other developed countries. The British Educational Communications and Technology Agency (BECTA) released in May 2005 a report[50] examining the extent to which OSS can support an efficient and functional delive... of the school curriculum and administration. It compared TCO profiles for a sample of 15 OSS schools and 33 non-OSS schools and highlighted examples of successful schools-based open-source implementation. The report concluded that "open-source software can provide suitable technical infrastructure and basic set of

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[42] See http://www.enterpriseappstoday.com/showArticle.jhtml?articleId=164902852.
[43] See http://www.prweb.direct.com/releases/2005/7/prweb257536.htm.
[44] See http://www.planetfinance.org.
[45] See http://www.gfusa.org.
[46] See https://www.agribazaar.com.my, and presentation made by MIMOS to the UNCTAD Experts Meeting on OSS.
[47] Tan Woon Tong, "Free Open Source Software Education" (see http://www.iosn.net/education/foss-education-primer.).
[48] See http://www.un.org/millennium/declaration/ares552e.htm.
[49] See www.educationau.edu.au/papers/open_source.pdf.
[50] Open Source Software in Schools: A case study report (see http://www.becta.org.uk/corporate/publications/publications_detail.cfm?currentbrand=all&pubid=265&catID).

applications for classroom use". According to that study, the potential for cost savings (as shown in Table 1 below) was listed as the main driver for using OSS, while other reasons included OSS transparency and flexibility as well as "the educational value of providing pupils with a broader experience of operational systems and software". Three main barriers for using or implementing OSS were identified as (a) "incompatibility with some curriculum software", (b) "inability to read files created in other applications", and (c) "lack of familiarity with the software and resistance to change from teachers and pupils."

Table 1
Summary of total costs of ownership (TCO) by school phase
(in pounds sterling)

	Primary schools		Secondary schools	
	OSS	**Non OSS**	**OSS**	**Non OSS**
Annual TCO per PC *	**691.92**	**1,228.04**	**787.32**	**1,035.70**
Annual TCO per student *	**139.88**	**195.45**	**227.27**	**246.61**
Annual software cost per PC	**44.66**	**64.14**	**32.55**	**67.08**
Annual network costs per PC	**14.10**	**66.93**	**61.57**	**56.76**
Annual support costs per PC	**422.02**	**709.99**	**489.99**	**650.10**

(Source: BECTA review[51])

* Comprises costs related to hardware, software, network, consumables, training, formal support and self-support

28. Resistance to change is probably one of the more difficult barriers to deal with in introducing OSS in the education sector, particularly in a software environment characterized by the overwhelming dominance of proprietary software. As recalled in the first JIU report on OSS, "Microsoft has more than a 90 per cent share of the operating systems and office productivity segments"[52] and these are the type of software most widely used in schools. Proponents of OSS point out that, quite often, the education sector contributes to perpetuate a chicken-and-egg situation in which schools do not wish to provide training on OSS applications because employers request from potential recruits a proficiency in using specific Microsoft applications such as Word or Excel, instead of more neutral specifications. In turn, employers blame the lack of OSS-skilled staff for their recruitment policies.[53]

Examples of open source software usage in education in developing countries

29. A report on two case studies highlighting the use of OSS in South African schools[54] summarizes well the challenge faced by ICT-disadvantaged schools which can only afford computers discarded as obsolete many years before. How do they get modern up-to-date software to run on old hardware, particularly when such software requires more computer resources to operate? The main conclusion drawn from the two case studies reviewed in the report is that, with OSS, "it is possible to provide modern, high-quality network services to schools using just the sorts of computers that ICT-disadvantaged schools in South Africa are likely to have, or are likely to be able to obtain". The conclusion is valid for similar schools in all developing countries. The following examples show other cases concerning the use of OSS in the education sector.

30. TuXlab[55] is a partnership between the Shuttleworth Foundation[56] and South African schools to provide learners (some 100,000 since the project started) access to information, knowledge and education through OSS computer centres. Such centres have been installed in schools in the Western Cape (110 since August 2003), Eastern Cape (25 since February 2005) and Limpopo (19 since March 2005) provinces.

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[51] "Open Source Software in Schools". A study of the spectrum of use and related ICT infrastructure costs" (see http://www.becta.org.uk/corporate/publications/publications_detail.cfm?currentbrand=all&pubid=264&cart=1).
[52] JIU/REP/2005/3, para.13.
[53] "Quand les inspecteurs de l'Education Nationale se font les VRP de Microsoft" (see http://www.framasoft.net/article2037.html).
[54] Guy Antony Halse & Alfredo Terzoli, "Open source in South African schools: two case studies" (see http://www.schoolnetafrica.net/fileadmin/resources/Open_Source_in_South_African_Schools.pdf).
[55] See http://www.tuxlab.org.za/.
[56] See http://www.shuttleworthfoundation.org.za/.

31. Computer4Kids[57] is a Southern African computer-education company established in 1995 with the aim of addressing the critical need for ICT training at school level. All its curriculum materials can be used in both Microsoft and OSS environments. It has signed recently an agreement with the Shuttleworth Foundation to supply 500 tuXlabs with its Integrated ICT core curriculum manuals and software and it will also provide the Foundation with updated modules and versions of the manuals and software as these become available.

32. The New Partnership for Africa's Development (NEPAD) has included among its list of six high-priority ICT projects a NEPAD e-School Initiative which aims to "impart ICT skills to young Africans in primary and secondary schools" as well as to harness ICT "to improve, enrich and expand education in African countries."[58] The initiative is scheduled to be implemented by 2015 and will involve some 600,000 schools. A demonstration phase was launched in July 2005 and will cover a first group of 20 countries. It is expected to directly impact approximately 150,000 African learners and teachers and will be implemented by five private sector enterprises, i.e. Cisco, Hewlett-Packard (HP), Inmarsat, Microsoft and Oracle. HP indicated that it intends to implement OSS solutions in some of the schools assigned to it. The NEPAD e-school initiative may thus be a golden opportunity for African leaders and the donor community to test the relevance of applying OSS in the education sector in Africa. Assuming a bare minimum of 20 PCs per school for the 600,000 schools expected to become NEPAD e-schools by 2015, 12 million PCs (new and/or refurbished) would be required, with corresponding licence fees close to US$ one billion based on a "social" licence fee of US$ 80 per machine using proprietary software (unless such software is provided free of charge).

33. The European and Latin American New Education (E-LANE) project[59] is a multi-stakeholder partnership funded by the European Union. It uses the LRN educational platform[60], an enterprise-class OSS originally developed at the Massachusetts Institute of Technology (MIT) for supporting learning and research. It aims to provide low-cost educational material by integrating (a) solid applications already implemented in the context of e-learning as an open software platform; (b) the design of an innovative teaching methodology oriented towards this platform; and (c) course content from some of the most prestigious educational institutions in Europe (France, Ireland, United Kingdom and Spain) and Latin America (Brazil, Chile, Colombia, Guatemala and Mexico).

34. Convinced that it is equally important to use non-formal learning outside the formal education sector to address the knowledge and digital divides, MIMOS spearheaded the Malaysian Grid for Learning (MyGfL),[61] a national e-learning initiative to support the life-long learning agenda in Malaysia. Using OSS in MyGfL has enabled its roll-out to Malaysia's ICT community centres which are largely located in rural areas.

D. Open source software in the health sector

35. At an expert meeting on FOSS organized in 2004 by the United Nations Conference on Trade and Development (UNCTAD), the point was made by a World Health Organization (WHO) representative[62] that using ICT for health requires (a) immediate tangible benefits; (b) a skilled work force; (c) reliable basic infrastructure; (d) a foundation of effective health practice; and (e) a commitment to affordability, equity and local solutions. It was considered that equity was the biggest challenge in bridging the digital divide and that while FOSS has an important role to play in public health, innovative partnerships will be key to its success (see Box 2).

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[57] See http://www.computer4kids.co.za/about.htm.

[58] NEPAD Annual report 2003-2004 (see http://www.nepad.org/2005/files/documents/165.pdf).

[59] See http://e-lane.org.

[60] See http://dokeos.org.

[61] See http://www.mygfl.net.my/mygfl/index.php3?pg=register&mv=member&Lang=571, and Presentation made by MIMOS to the UNCTAD Experts Meeting on OSS.

[62] Dr. Joan Dzenowagis, "Bridging the digital divide in health: the role of free and open source software" (see http://r0.unctad.org/ecommerce/event_docs/foss/dzenowagis.pdf).

Box 2

Equity is the biggest challenge in bridging the digital divide in health

High-income countries:	*Low-income countries*
•16 per cent of population	*•84 per cent*
•7 per cent of burden of disease	*•93 per cent*
•89 per cent of health spending	*•11 per cent*
•94 per cent of Internet hosts	*•6 per cent*

Source: "Bridging the Digital Divide in Health. The Role of Free and Open Source Software" (see also: http://r0.unctad.org/ecommerce/event_docs/fossem/dzenowagis.pdf)

Electronic health records (EHR) systems

36. In a joint publication on the use of OSS in the biomedical sector[63], the authors made reference to two reports of the U.S Institute of Medicine (IOM)[64] and noted that, according to the first report issued in 1999[65], in the United States alone, "at least 44,000 people, and perhaps as many as 98,000 people die in hospitals each year as a result of medical errors that could have been prevented." Even by using the lower estimate, such preventable medical errors in hospitals are said to exceed the number of deaths attributable to motor-vehicle wrecks, breast cancer, and human immunodeficiency virus acquired immunodeficiency syndrome (HIV/AIDS), resulting in total costs estimated between $17 billion and $29 billion per year in hospitals nationwide, not counting the cost in human lives that could have been spared. The second report[66] argued "electronic health records that allow care providers to gather, store, and use health information more efficiently could increase the effectiveness of care and greatly reduce errors and costs". Despite EHR being recognized as essential to improving health quality and managing health care delivery whether in a large health system, hospital, or primary care clinic, several barriers such as excessive costs, instability of vendors or lack of common data standards seriously hinder their wide adoption, particularly in developing countries.

37. In the framework of the "The President's Emergency Plan for AIDS Relief" (PEPFAR) – a five year, US$ 15 billion programme established by the Government of the United States of America as a comprehensive response to the worldwide HIV/AIDS epidemic – the U.S. Agency for International Development (USAID) completed a software inventory report[67] to assist health care providers in evaluating available software resources. Thirteen applications for use with HIV/AIDS medical care were evaluated. Among these, five were OSS-based applications, the most popular being Care2x,[68] OpenEMR[69] and WorldVistA.[70] The report concludes, inter alia, that (a) health information systems are weak in most developing countries; (b) the lack of information about population health services result in inefficient allocation of scarce resources; (c) the international community can help improve the situation by providing assistance for the development of a reference anti-retroviral therapy information system;[71] and (d) for such a reference system, the OSS model is the best model for providing customisation and building in-country capacity.

Other initiatives

38. There are several cases of health institutions that have adopted OSS or e-health projects based on open source. At the end of May 2005, the United States Department of Health and Human Services (HHS) signed a three-year multi-million dollar agreement with Novell which will grant HHS users unlimited access to the company's leading products including those based on Linux for servers and desktop. While Microsoft products will continue to be widely used throughout HHS, analysts estimate that the low unit cost of Novell's Linux products will be attractive to thousands of scientific users from the National Institutes of

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[63] S. Meystre, H. Müller, "Open source software in the biomedical domain: electronic health records and other useful applications" (see http://www.sim.hcuge.ch/medgift/publications/SMI2005_OS.pdf).
[64] See http://www.iom.edu/ .
[65] "To err is human: building a safer health system" (see http://www.iom.edu/includes/dbfile.asp?id=4117).
[66] "Key capabilities of an Electronic Health Record System" (see http://www.iom.edu/report.asp?id=14391).
[67] "President's Emergency Plan for AIDS Relief: Software Inventory Report. 24 June 2004" (see http://www.rhinonet.org/tikiwiki/tiki-download_file.php?fileId=13).
[68] See http://www.care2x.org/ .
[69] See http://www.openemr.net .
[70] See http://www.worldvista.org .
[71] See footnote 67 above, para. 6.1.

Health (NIH) – the primary federal agency conducting medical research in the United States – and other HHS agencies such as the Centers for Disease Control and Prevention.[72]

39. Access to information has become very crucial in the fight against HIV/AIDS. The China AIDS Survey[73] is an online OSS database dedicated to the epidemic in the People's Republic of China. It provides access to hundreds of summarized news reports from different sources, links to Chinese and international HIV/AIDS organizations and briefs on the main issues concerning HIV/AIDS in China.

40. The **iPath project**[74] started from a research project at the Department of Pathology of the University Hospital of Basel, Switzerland. It main objectives are (a) operating an open telemedicine platform;[75] (b) the development of the open-source iPath telemedicine software; and (c) supporting sustainable telemedicine projects in developing countries. According to the project's web site, in 2004 the iPath telemedicine server had more than 1,400 users in Basel and it received over 70 telepathology consultations per month from developing countries.

41. The **Tropical Disease Initiative**[76] has its roots in the assessment that, due to convergence between computing and biology, the open source methods could be used to organize early-phase drug discovery. In a report entitled "Finding cures for tropical diseases: is open source an answer?"[77] and published in a number of medical journals, three professors from two top American universities (the University of California and Duke University) recall that "[m]ore than 500 million people – one tenth of the world's population – suffer from tropical diseases at any one time. Malaria alone causes between 1.5 to 2.7 million deaths per year, almost all of them in developing countries. Additional high mortality rates result from African sleeping sickness, dengue fever, river blindness, elephantiasis, leishmaniasis, Chagas disease, and schistosomiasis". They consider that the reasons why so many people die are more economic than scientific, pointing out that traditional pharmaceutical companies cover their research and development (R and D) costs by selling patented products while most would-be consumers in developing countries are penniless. They argue therefore that the OSS development model could be applied in biology and that such a new approach – the open source drug discovery – could significantly reduce the cost of discovering, developing and manufacturing cures for tropical diseases, an area where research is badly underfunded.

E. Requirements for an enabling environment

42. In its *Human Development Report 2001*, UNDP considered inter alia that "open-source software could speed the information and communications technology revolution if its use takes off on a sufficiently wide scale".[78] While it is established that in many sectors related to the development agenda there are OSS applications which are valid alternatives to corresponding proprietary software, an increased use of OSS will depend on a number of requirements. Assuming that the necessary infrastructure and connectivity are available, such an enabling environment for a wide-scale OSS usage would include first and foremost affordable access to hardware and software, an increased awareness of the potential of OSS particularly among policy-makers, capacity-building and adequate funding.

Access to hardware

43. Access to hardware is a prerequisite that must be satisfied irrespective of the type of software used. Although the cost of new hardware has been in constant decline, it remains unaffordable for most people in developing countries. Some ongoing projects aim at addressing the issue of affordability of PC's through government-subsidized purchase programmes or the design and commercialization of low-cost computers. In Brazil, the Government launched the "PC Conectado"[79] initiative to subsidize the acquisition of one million OSS-based computers by low-income citizens. In India, an entry-level PC running on Linux and priced below 10,000 rupees (about US$ 230) was put on the market in August 2005,[80] an initiative backed by the

[72] See http://informationweek.com/story/showArticle.jhtml?articleID=163702338.
[73] China AIDS Survey (see http://www.casy.org/).
[74] See http://ipath.ch/about/.
[75] See http://telemed.ipath.ch/.
[76] See http://www.tropicaldisease.org/.
[77] Stephen M. Maurer, Arti Rai and Andrej Sali, "Finding cures for tropical diseases: is open source an answer?" (see http://www.tropicaldisease.org/documents/MaurRaiSali_BioTechReport.pdf).
[78] *Human Development Report 2001*, page 113 (see http://hdr.undp.org/reports/global/2001/en/).
[79] See http://www.softwarelivre.gov.br/noticias/News_Item.2005-03-29.2402.
[80] See http://news.bbc.co.uk/1/hi/world/south_asia/4273927.stm.

Government with the objective to increase the number of PC owners from the current level of 15 million to 75 million by 2010.

44. Another promising venture is the One Laptop Per Child (OLPC) project initiated by MIT Media Lab[81] to deliver a US$ 100 portable computer, targeting mostly developing countries. The proposed machine will be a Linux-based, full-colour, full-screen laptop using innovative power (including wind-up) and capable of doing almost everything except storing huge amounts of data. The Secretary-General of the United Nations and the Director of MIT Media Lab unveiled a prototype during the Tunis phase (16-18 November 2005) of the World Summit on the Information Society (WSIS) and a number of developing countries have already shown great interest in the project.

45. Refurbished PCs have been and continue to be another option for affordable access to hardware. In March 2003 UNESCO hosted in Paris an international meeting on "New synergies for the recycling of information technology equipment"[82] to discuss issues related to the recycling of millions of computers and other equipment decommissioned each year. In that connection, a survey of 20 global corporations in Europe and the United States conducted by the Digital Partnership[83] found out that more than one million PCs were to be decommissioned in the following three years. According to the study, "computing units are obsolete within a year of purchase, and some even within six months. Yet this equipment would be very useful in developing countries, if the recycling process were included in a sustainable development programme". Overall, there are estimates indicating that, over a five-year period, more than 600 million computers will be discarded by companies worldwide. A number of NGOs, such as Computer Aid International[84] or Computers for Africa[85] are therefore active in the refurbishment of computers and sending them to developing countries, generally at a reduced cost, covering their charges. UNDP-APDIP signed an agreement with Computer Aid International[86] to develop/distribute an Ubuntu Linux-installed compact disc (CD) for 25,000 refurbished PCs to be delivered to Africa in 2005. The CD includes IOSN's Linux end-user training materials in multimedia format and IOSN FOSS primer publications. Refurbished PCs may be a blessing or a curse and there is an ongoing debate as to whether, in the long run, developing countries will not become dumping grounds for the developed world's used IT equipment, with negative environmental consequences.

46. Whether by using new or refurbished PCs, the challenge of providing affordable access to hardware cannot be met without a different vision of the PC – not only as a "personal computer" but more as a "public computer". Hence the popular appeal of telecentres and community centres providing access to different ICT services, including the Internet. A 2000 review of telecentres in Africa[87] found Senegal to be the African country with the largest number of telecentres (9,000), most of which have performed very well as sustainable small businesses. Some experts argue, however, that while the telecentre model represents in theory the most cost-effective solution to the issue of access, it has failed in many countries due, inter alia, to lack of support, lack of funding for ongoing costs and/or lack of suitable applications.

Access to software

47. Although most OSS applications are freely downloadable from the Internet, they may not come cheap in many developing countries due to the low speed of connectivity and the relatively high cost of telecommunications. As highlighted in the July-August 2005 issue of *Foreign Affairs* , with a map showing sample hourly rates at Internet cafes and the percentage of people living on one dollar per day in 26 nations, "Internet cafes are often heralded as a simple route online. But in many countries, the cost of one hour of Internet access can wipe out a day's wage".[88] Making OSS available on CDs can thus be a more convenient and affordable way for accessing the software. In that framework, the Shuttleworth Foundation launched in South Africa a very innovative initiative called the Freedom Toaster[89] (see annex II). It is a conveniently located, self-contained facility where users bring their own blank discs and make copies of the OSS that they require.

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[81] See http://laptop.media.mit.edu/.

[82] See http://portal.unesco.org/en/ev.php-URL_ID=16046&URL_DO=DO_TOPIC&URL_SEC=201.html.

[83] See http://www.digitalpartnership.org/about_model.html#recycled.

[84] See http://www.compuaid.org.

[85] See http://www.computersforafrica.org.

[86] See http://www.computeraid.org/press/press.htm.

[87] Peter Benjamin, "African experience with telecentres" (see http://www.isoc.org/oti/articles/1100/benjamin.html).

[88] Francis C. Haub, "Cost of Cyberliving" (see http://www.foreignpolicy.com/story/cms.php?story_id=2594&print=1).

[89] http://www.freedomtoaster.co.za/.

48. Several other projects and initiatives are addressing the issue of access to software, including by CSOs. NGO-in-a-box[90] is one such project. It aims to assist NPOs in selecting the proper software among the enormous amount of OSS available and to have access to such software and related documentation. It also makes available to technical service providers and support staff of these organizations sets of tools and material aggregated around specific themes.

Raising awareness

49. The need to increase awareness on the potential benefits of using OSS by public administrations has been underlined in the previous JIU report. Among the many initiatives taken to promote OSS, the "Go Open Source"[91] campaign and "Software Freedom Day"[92] are particularly noteworthy.

50. The Go Open Source campaign is the product of a coalition between the Shuttleworth Foundation, HP, Canonical, and the Meraka Institute.[93] It considers that "particularly in Africa, the reasons to Go Open Source are many and compelling, with the low cost and high potential for innovation around open source software attracting the attention of government, society and enterprise across the continent."[94] Its activities include providing copies of the Open CD for free, launching the world first television show dedicated to OSS (13 episodes have been aired on the South African TV) and organizing in August 2005 in Johannesburg the Go Open Source Task Team Conference, during which leading advocacy groups, key stakeholders within government and high-profile organizations will discuss and establish a report that will turn the existing OSS policy into an action plan.

51. Software Freedom Day is a global grassroots effort to promote public awareness and use of FOSS. More than 70 teams joined the celebration in 2004, organizing a range of events at schools, universities and public places. In 2005 the event was held on 10 September.

Capacity-building

52. Most of the OSS policies adopted by Member States and highlighted in the previous JIU report[95] have included capacity-building among their objectives. Related activities cover the establishment of competency centres, the inclusion of OSS training in the curriculum of educational and vocational institutions, training for public sector personnel, etc. While certification for computer skills used to be awarded for traditional proprietary software, there are now several recognized institutions that provide valid certification for OSS training. Those include for instance the European Computer Driving License Foundation (ECDL-F)[96] as well as professional OSS institutions such as the Linux Professional Institute (LPI).[97]

53. The East African Centre for Open Source Software (EACOSS),[98] based in Kampala, where it started its operations in 2004, is an initiative of Uganda Martyrs University[99] and Linux Solutions Ltd.[100]. It is the first specialized OSS training centre established in that region. By providing training, certification and access to free software, EACOSS has among its declared objectives to contribute to national development by empowering people with the required skills for job creation and entrepreneurship, the standardization of OSS skills on the market and the development of local ICT industry. The project is supported by three partners from the Netherlands, including the International Institute for Communications and Development (IICD).[101]

54. As more recognized OSS skills are available, the challenge for all potential employers, including public administrations and United Nations system organizations, will be to brake the vicious circle mentioned in paragraph 28 above by reviewing their recruitment policies so that the computer skills requested are generic and not specific, proprietary software or vendor-oriented. Public administrations at all levels and United Nations system organizations should also maintain vendor neutrality in software procurement policies.

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[90] See http://ngoinabox.org.
[91] See http://www.go-opensource.org/.
[92] See http://www.softwarefreedomday.org/.
[93] See http://www.meraka.org.za/.
[94] See http://www.go-opensource.org/campaign-general-ost-task-team-tore-plan.
[95] JIU/REP/2005/1.
[96] See http://www.ecdl.com/main/index.php.
[97] See http://www.lpi.org/.
[98] See http://www.eacoss.org/index.php?option=com_frontpage&Itemid=1.
[99] See http://ug.boosing.com/ni.cms/.
[100] See http://www.linuxsolutions.co.ug/.
[101] See http://www.iicd.org/.

Resource allocation for OSS applications

55. The fact that OSS applications usually come without licence fees does not mean that there are no costs involved in their acquisition and use. As underlined in particular by the proponents of "free software" or FOSS, the term free relates to freedom, as in free speech – and not to cost, as in free beer. With OSS as well as proprietary software, if customized training and support are required, they do entail costs for the user. This partly explains the ongoing debate about the comparative TCO of proprietary software versus OSS. TCO varies widely based on geographical regions, organizational context and availability of skills. Besides, as noted in the first JIU report on OSS, "TCO models based exclusively on economic factors may not grant enough weight to strategic and social benefits which many Governments consider to be important features of their ICT policies".[10] Governments and other stakeholders should therefore be as much ready to support funding for OSS-based initiatives as they would if they were to opt instead for implementation in a closed source environment (**recommendation 2**).

[10] A/61/317/2006/3, para. 25.

CHAPTER III: OPEN SOURCE SOFTWARE AND THE DEVELOPMENT AGENDA OF UNITED NATIONS SYSTEM ORGANIZATIONS

A. United Nations

56. Within the Department for Economic and Social Affairs (DESA) of the Secretariat, the United Nations Online Network on Public Administration and Finance (UNPAN)[107] plays a pivotal role as a "source of information exchange, experience-sharing and on-the-job training in the area of public sector policy and management utilized by public offices, policy makers, public administration institutions and experts. As a global online information and knowledge network, UNPAN continues to facilitate capacity-building, dialogues among stakeholders at the national level and expanded collaboration among Member States, especially developing countries. Moreover, UNPAN provides ongoing access to the most innovative research, training practices, methodologies and technical assistance".[108] It could contribute to an increased awareness on the worldwide growing trend of public administrations using OSS for e-governance by highlighting best practices. In particular, it could develop a partnership with the European Union IDABC (Interoperable Delivery of European eGovernment Services to Public Administrations, Businesses and Citizens)[109] that maintains the Open Source Observatory (OSO),[110] a web site dedicated to OSS and intended to spread best practices. OSO contains inter alia a catalogue of replicable OSS solutions for e-government and it highlights some OSS case studies.

57. As recalled in paragraph 12 above, ECA has been supportive of initiatives promoting the use of OSS in Africa. In that connection, under the broader scope of the African Learning Network, ECA initiated in August 2003 the VarsityNet[111] project aimed at enhancing the role of universities as centres of excellence in research, specifically with respect to the development of innovative ICT solutions to national and regional challenges. A pilot research and development project based on OSS is under way, supported by the Ford Foundation and implemented by Addis Ababa University (AAU) and the Inter-University Council of East Africa (IUCEA). The project in Ethiopia is engaged in research on a pilot application in the area of e-government and the use of the Amharic local language for a web-based, multilingual and multi-alphabet, customizable document exchange platform to be used by local and central governments in the country. IUCEA is implementing the project in collaboration with the Universities of Nairobi (Kenya), Makerere (Uganda), Dar-es-Salaam (United Republic of Tanzania) and the Jomo Kenyatta University of Science and Technology (Kenya) to develop a pilot application that supports the International Fellowships Programme and the Inter-University Students Exchange Programme for East Africa. Phase II of the project is being executed and relates to the development of an OSS-based Inter-University Information Management System at IUCEA and Health Information System at AAU.

B. United Nations Development Programme

58. The United Nations Development Programme (UNDP) has been a pioneer in the use of ICT as an enabler for development processes and agendas as it has been supporting dedicated programmes and resources in this field since 1992. The Sustainable Development Networking Programme (SDNP)[112] was launched by UNDP that year. The programme essentially aimed at providing access to up-to-date information and knowledge resources to developing country decision-makers and stakeholders through the use of the new technologies that emerged in the 1990s. SDNP was the first United Nations-supported programme to promote the use of OSS in developing countries -long before the term open source was coined in 1998. In effect, the programme started using OSS since 1994 for both technical and financial reasons. Since then, UNDP has accumulated extensive knowledge and expertise on OSS and it has elaborated an OSS for development framework which essentially emphasizes three aspects of FOSS: (a) FOSS as a global public good developed and distributed by an international community of civil society members; (b) FOSS as a capacity development tool to promote local software development and local R and D while enhancing the delivery of basic services; and (c) FOSS as a tool to increase digital inclusion and develop/deploy localized and affordable solution for the poor and "have-nots". Through SDNP, UNDP and private-sector entities have

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[107] See http://www.unpan.org.

[108] A/58/180, para. 23.

[109] See http://europa.eu.int/idabc.

[110] See http://europa.eu.int/idabc/en/chapter/7600.

[111] See http://www.iucea.org/Internal_Public/flyer_projects_new_details_and_projects_table_all_1.0.

[112] See http://sdnp.undp.org.

been supporting the use of FOSS in more than 40 developing countries in Asia, Latin America and Africa since 1995.

59. At the regional level, UNDP and APDIP[109] launched IOSN,[110] which is recognized as a centre of excellence for OSS in the Asia-Pacific Region, with the following objectives: (a) to serve as a clearinghouse for information on OSS; (b) capacity-building; (c) to provide assistance for the development of resource materials, as well as to support localization efforts; and (d) to assist in the coordination of programmes and initiatives through information sharing and networking. The project started in June 2003, initially for a two-year period and is jointly funded by UNDP and the International Development Research Centre (IDRC, Canada). IOSN proved to be very successful in raising awareness within and outside the South Asian region, by creating and maintaining an OSS portal, organising training events, workshops and seminars, and through a series of FOSS primers[111] targeting policy-makers, practitioners and educators.

60. In late 2003, UNDP launched a global programme to support the use of OSS as a tool for capacity development. The programme has four main objectives: (a) to deploy regional and sub-regional centres that support the use of OSS in four areas: policy, capacity development, content and applications, and enterprise development; (b) to promote OSS policies that create a level playing field for OSS vis-à-vis other alternatives; (c) to create and/or strengthen new or existing OSS networks and gather all related OSS applications with a focus on e-governance and the MDGs; and (d) to promote the sharing of experiences and best practices at both the regional and global levels of OSS use. A pilot of this programme was launched in Bulgaria in 2004[112] to work with local municipalities promoting increased access of citizens to government resources and services. It will soon expand to include Bosnia and Herzegovina, Croatia, Macedonia, Romania, Serbia and Montenegro. In Africa, the Johannesburg-based UNDP Regional Service Centre for Eastern and Southern Africa is also active in the promotion of OSS. In July 2005, it signed with the Meraka Institute an agreement expected to boost the OSS capacity in the region.[113]

C. United Nations Conference on Trade and Development

61. The United Nations Conference on Trade and Development (UNCTAD) has been active in promoting OSS by (a) raising awareness on the potential benefits of OSS through publications and meetings such as the one organized in Geneva in September 2004[114] and (b) participating to multi-stakeholders partnerships involving international organizations, IT corporations, and NGOs. Its "E-Commerce and Development Report 2003"[115] contained a long chapter on OSS.[116] During the 11th session of UNCTAD (São Paulo, 13–18 June 2004), the secretariat submitted a note[117] on multi-stakeholder partnerships including one on FOSS training aiming to: (a) "Contribute to closing the digital divide by enabling developing countries to better use FOSS and related processes"; (b) "Improve the quality of national and international policy formulation on issues related to FOSS"; (c) "Develop human capacity to produce, service and use FOSS"; and (d) "Establish new and dynamize existing conduits and structures for collaborative development and distribution of FOSS".[118] The expected results are said to be "an increase in the number of trained experts and policy makers aware of the technical and development possibilities of FOSS."

D. Food and Agriculture Organization of the United Nations

62. As noted in the first JIU report on this subject, the Food and Agriculture Organization of the United Nations (FAO) "makes considerable use of OSS covering application development, web applications, and systems administration tools."[119] It has developed a number of applications detailed thereafter.

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[109] See http://www.apdip.net.
[110] See http://www.iosn.net.
[111] See http://www.iosn.net/foss-primers/.
[112] See http://www.foss.bg.
[113] See http://www.cmi.co.za/pls/portal/portlet.PGEntity_ARTICLE_ARTICLE_SO_C?pnode=.
[114] Expert Meeting on Free and Open Source Software: Policy and Development Implications.
[115] See http://www.unctad.org/Templates/Download.asp?docid=4225&lang=1&mode=dl=1634.
[116] Ibid., "Free and open source software: implications for ICT policy and development".
[117] TD/400.
[118] Ibid., para. 3.
[119] JIU/REP/2005/3, para. 104.

Key Indicators Data System (KIDS)

63. KIDS is a generic OSS information system that manages and monitors statistical and indicator data, providing basic mapping, overlay and analytical functions used within FAO, other United Nations agencies and Member States for the development of food insecurity statistics, animal and plant disease control, health, nutrition and agricultural production, primarily at country level. It is completely open-source and web-based and displays localization capabilities.

Transboundary Animal Disease Information System (TADinfo)

64. TADinfo[120] is a software package under open source licence designed to provide data management and decision support to national veterinary epidemiology units. It allows users to freely access the source code and add further modules as required. While the basic application itself is available free of charge, before deployment it must be pre-configured with geographic data such as appropriate names of villages and administrative boundaries. Typical costs for such pre-configuration by FAO amount to approximately US$ 2000. TADinfo has been deployed to nearly 40 countries across the world and has been recognized as able to fulfil most countries' requirements related to disease data analysis and national and international reporting obligations. Veterinary services of approximately 23 countries have decided to adopt the TADinfo software as an integral and fully functional part of their national animal health information system.

GeoNetwork opensource[121] and InterMap opensource

65. GeoNetwork opensource is an OSS-based spatial information management system developed for use both at headquarters and in the field. It has been designed to provide access via the Internet to the spatial database maintained by FAO to support decision-makers in agriculture, forestry, fisheries and food security and to promote multidisciplinary approaches to sustainable development by allowing FAO, other United Nations agencies, NGOs and research institutes worldwide to share and distribute more easily reliable geographically referenced information. Started by FAO in 2000, the project has become a collaborative endeavour involving other UN system organizations. In 2005 FAO formed a GeoNetwork consortium with World Food Programme (WFP), the United Nations Environment Programme (UNEP), WHO, the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) and the Consultative Group on International Agricultural Research (CGIAR). The consortium is currently implementing the software in more than 30 locations that will all be able to synchronize content through the network and with external systems. Several non-United Nations initiatives working on Spatial Data Infrastructures (SDI) at country level are also picking up the software as an integral part of their SDI development. Work is under way to create an Open Spatial data Infrastructure (OpenSDI), based on the GeoNetwork open source software in combination with several related FOSS applications, which would ultimately lead to an effective United Nations Spatial Data Infrastructure (UNSDI).

66. The InterMap opensource is a FOSS-based interactive mapping system jointly developed by FAO and WFP to interactively access and combine maps from distributed servers on the Internet. It is an integral part of a GeoNetwork Spatial Data Management system. Both systems implement standards from the International Standards Organization Technical Committee 211 on Geographic Information (ISO-TC211) and the Open Geospatial Consortium (OGC) to ensure interoperability with other compliant map servers around the world. (They are maintained on SourceForge.net respectively at http://geonetwork.sourceforge.net and http://sourceforge.net/projects/intermap).

E. United Nations Educational, Scientific and Cultural Organization

67. The United Nations Educational, Scientific and Cultural Organization (UNESCO) promotes international cooperation and dissemination of knowledge in the fields of education, sciences, culture and communication. Therefore, the organization recognizes that community approaches to software development in general, and OSS in particular, have a very significant role to play. There are a number of activities undertaken by UNESCO in support to OSS.

[120] See http://www.fao.org/ag/againfo/resources/en/tadinfo/about.html.

[121] See http://www.fao.org/geonetwork/srv/en/main.search, http://www.fao.org/newsroom/en/news/2004/48327/index.html.

UNESCO Free Software Portal

68. The UNESCO Free Software Portal[122] was developed and published in November 2001. It is maintained by the Information Society Division and provides a one-stop access point to reference documents on the FOSS movements, as well as to web sites hosting the most popular and useful FOSS packages in UNESCO's fields of competence. The portal also mirrors the Free Software Directory,[123] a joint project of UNESCO and the Free Software Foundation (FSF) that catalogues useful free software that runs under free operating systems — particularly the GNU operating system and its GNU/Linux variants.

Greenstone Digital Library (GSDL)[124]

69. UNESCO has produced with the New Zealand Digital Library Project (NZDL) of the University of Waikato and the Human Info NGO (Antwerp, Belgium) a multilingual version of the Free and Open Source Greenstone Digital Library software suite. It is expected that the Greenstone software package will enable educational, scientific and cultural institutions worldwide to build and share compatible digital libraries of open access and public domain information. UNESCO makes available free of charge CD-ROMs containing Greenstone 2.60, documentation available in four "core" languages (English, French, Spanish, Russian) and documented examples of digital libraries and associated software. A feasibility study conducted by UNESCO suggested that the open-source GSDL, associated with appropriate training and documentation, could constitute a unique resource in the implementation of digital libraries for Africa.

Open eNRICH

70. The Open eNRICH project was initiated as a collaborative effort between UNESCO, the National Informatics Centre (NIC) in Delhi, an the Open Knowledge Network to develop a new software tool for the creation and exchange of locally relevant content and knowledge within and between communities in developing countries, in local languages and on issue of their interest – health, education, employment, agriculture, using different media – audio, video, text etc. It offers a wide range of utilities to a community of users, such as: content management and exchange, portal management, feedback and messaging facilities, multi-language support.

Other initiatives

71. UNESCO assisted in the deployment of an open-source Learning Management System (LMS) at the Arab Open University in Bahrain,[125] which was further replicated in Jordan[126] and Saudi Arabia.[127] Together with UNDP, UNESCO also organized a consultative meeting of specialists to assess the needs of developing countries in terms of OSS and of modalities to pursue an OSS initiative for developing countries with special focus on Africa. UNESCO has partnerships with FSF, the Free and Open Source Software Foundation for Africa (FOSSFA)[128] and various OSS-active non-governmental organisations (NGOs) and is participating to the Latin American and Caribbean Conference on Free Software Development and Use (LACFREE). In addition, UNESCO is informally collaborating with FAO, UNEP, UNDP and UNCTAD in promoting OSS. Other activities undertaken by UNESCO in support of OSS are: development, distribution and translation of UNESCO OSS software (CDS/ISIS database software[129] and IDAMS statistical software[130]).

72. A project on the "Economic evaluation of free and open-source software (FOSS) solutions for African education" was intended to "provide a definitive statement and guidelines on the relative advantages and disadvantages of FOSS compared with proprietary software solutions for use in African education, paying particular attention to the economic factors that need to be considered by governments, officials and educators in determining the software environments that they will develop or finance". The project was planned to be implemented in three phases using extra budgetary funds. Upon inquiry, it appears that the project will not be finalised due to funds shortage.

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[122] See http://www.unesco.org/webworld/portal_freesoft .
[123] See http://fsd.unesco.org/directory/ .
[124] See http://www.greenstone.org/cgi-bin/library
[125] See http://www.aou.org.bh:8000/lms .
[126] See http://www.aou.lms.org .
[127] See http://www.aoulms.com/eclass .
[128] See http://www.fossfa.net.tiki-index.php?page=FOSSFA .
[129] See http://portal.unesco.org/ci/en/ev.php-URL_ID=20718URL_DO=DO_TOPIC&URL_SECTION=201.html .
[130] See http://portal.unesco.org/ci/en/ev.php-URL_ID=15653&URL_DO=DO_TOPIC&URL_SECTION=201.html

F. World Health Organization (WHO)

73. At its 58th session, the World Health Assembly examined a report on eHealth[131] and adopted resolution WHA58.28 in which it stressed that "eHealth is the cost-effective and secure use of information and communications technologies in support of health and health-related fields, including health-care services, health surveillance, health literature, and health education, knowledge and research".[132] The Assembly urged Member States inter alia (a) "to consider drawing up a long-term strategic plan for developing and implementing eHealth services in the various areas of health sectors, including health administration, which would include an appropriate legal framework and infrastructure and encourage public and private partnerships" and (b) "to endeavour to reach communities, including vulnerable groups, with eHealth services appropriate to their needs".[133] In the same resolution, the Assembly also requested the Director-General among other tasks, (a) to "facilitate the development of model eHealth solutions which with appropriate modification could be established in national centres and networks of excellence for eHealth" and (b) to provide technical support to Member States in relation to eHealth products and services by disseminating widely experiences and best practices, in particular on telemedicine technology, devising assessment methodologies, promoting research and development, and furthering standards through diffusion of guidelines."[134]

74. Considering the different cases where OSS is currently used for e-health services, both in developed and developing countries, WHO should take due account of the potential of OSS when assisting Member States in the preparation of their long-term strategic plans called for by the resolution WHA58.28. In addition, more should be done by WHO to highlight cases of best practices in the use of OSS in the health sector (inter alia through the Global eHealth Observatory to be created).

G. United Nations Institute for Training and Research

75. Being committed to supporting programmes that will have a sustainable impact, the United Nations Institute for Training and Research (UNITAR) has included in its mission statement and its activities the responsibility for "enhancing the ability for LDCs to express their needs with regard to the role that information technology can play in alleviating poverty, supporting good governance and human rights protection".[135] It has developed in 2003 an "Information Society Programme" with a dedicated web site[136] entirely made with open source. The web site states on its homepage that OSS "enables active dissemination of information technologies in low-income countries without increasing royalties' expenses to software publishers from developed countries".

H. General assessment of the contribution of United Nations system organizations to the use of open source software for development

76. While the above examples attest that several organizations are contributing in various ways to the promotion of OSS, much more remains to be done. The Inspector notes that, most organizations have designed their web sites in such manner that even their own initiatives related to OSS are difficult to locate. Notable exceptions are the OSS portal maintained by UNESCO and the UNDP/APDIP-IOSN portal referred to in paragraph 59.

77. More generally, United Nations system organizations could take better advantage of their credentials as centres of excellence in their respective domains as well as their extensive field network and experience in development issues to (a) evaluate what works and what does not so as disseminate best practices on the use of OSS, thus contributing to increase awareness; (b) provide better exposure and online access to OSS applications either developed in-house or directly related to their field of activity; (c) initiate or participate in multi-stakeholder partnerships, etc. **(recommendation 3)**.

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[131] A/58/21.
[132] WHA58.28, preambular paragraph 1.
[133] Ibid., operative para.1.
[134] Ibid., operative para. 2.
[135] See http://www.unitar.org/programme_en.htm.
[136] See http://egov.unitar.org/spip/rubrique11.html.

CHAPTER IV: OPEN SOURCE SOFTWARE AND PARTNERSHIPS FOR DEVELOPMENT

78. Many OSS proponents consider that, in the framework of ICT for development policies, bilateral and multilateral donors should take into account the benefits of OSS, including in their official development assistance programmes.[137] Indeed, in a survey of open source software in Government sponsored by the Italian Ministry for Innovation and Technologies,[138] it is recommended, inter alia, "the creation of a network to distribute research results to developing countries and establish collaborative and training relations with them", with a particular focus "placed on the use of open source in e-government, especially in the 'e-Government for Development projects' that the Ministry is working on as part of the Government's international cooperation activity".[139] The following selected case studies highlight initiatives related to OSS, either in the framework of bilateral/multilateral ODA programmes or under multi-stakeholders partnerships.

The ADEN project[140]

79. The French Ministry of Foreign Affairs has initiated a cooperation project called ADEN (*Appui au DEsenclavement Numérique*) which aims are summarized below (see Box 3.)

Box 3

The ADEN Project

(http://www.africaden.net/article.php3?id_article=138)

Budget (2004-2006):

6 000 000 €

ADEN is a cooperation project initiated by the French Ministry of Foreign Affairs. Its aim is to foster the development and use of ICT in Africa through the creation of a network of public Internet access points. ADEN has three facets: equipping and connecting the sites, training the staff, providing support for the local production of content and IT applications. It is primarily intended for African civil society and promotes the use of open source software.

- **13 countries** (Angola, Burkina Faso, Burundi, Cameroon, Ethiopia, Guinea, Mali, Mozambique, Nigeria, Central African Republic, Democratic Republic of the Congo, Senegal, United Republic of Tanzania).
- **40 training the trainer courses**
- **60 public Internet access points**

Catalysing Access to ICT in Africa (CATIA) programme[141]

80. CATIA is a $15 million, three-year programme of the British Department for International Development (DFID) in collaboration with development agencies from three donor countries[142] and other role players from the private sector or civil society[143]. The programme will be implemented in close coordination with the Canadian government's Connectivity Africa initiative and will end in April 2006. It consists of nine distinct component projects including one on "low-cost computers and open source software" (component 2a) that aims to support "the ongoing efforts of Africans seeking to identify strategies for the development of appropriate low-cost computers and open source software in order to help broaden access to information and communications in Africa".[144] CATIA provided support to Idlelo[145] - the First

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[137] Jordi Carrasco Munoz, "Open source as official development aid in developing countries" (see http://www.newsforge.com/software/02/07/03/160255.shtml?tid=51).

[138] See http://www.innovazione.gov.it/eng/news/allegati/OS_survey.pdf .

[139] Ibid., para. 6.5.3.

[140] See http://www.africaden.net/article.php3?id_article=138 .

[141] See http://www.catia.ws/ .

[142] The Canadian International Development Agency (CIDA), the International Development and Research Corporation (IDRC), the US Agency for International Development (USAID) and the Swedish International Development Agency (SIDA).

[143] Such as Cisco, Bridges.org, the University of Western Cape (UWC), the Fantsuam Foundation in Nigeria (http://www.fantsuam.com) and Open Research (http://www.openresearch.co.za).

[144] See http://www.catia.ws/components_content.php?id=9 .

[145] See http://www.catia.ws/Documents/Indexpage/IdleloFinalReport.pdf .

African Conference on the Digital Commons, held in Cape Town in January 2004 – as well as the development of a guide on the set up and operation of a low-cost computer production centre,[146] an OSS policy toolkit,[147] a study on TCO of low cost PC[148] and support to a Solo computer project.[149]

FLOSSWorld[150]

81. FLOSSWorld is a € 660,000 (euro) multi-stakeholders project funded by the European Union and planned to be implemented from 1 May 2005 to 30 April 2007. Its declared objective is to "strengthen Europe's leadership in international research in FLOSS and open standards, and to exploit research and policy complementarities to improve international cooperation, by building a global constituency of policy-makers and researchers". The project consortium is coordinated by Maastricht Economic Research Institute on Innovation and Technology (MERIT) of the Netherlands, which has recently merged with the United Nations University Institute for New Technologies (UNU-INTECH)[151] specialized in research and training on the role of new technologies and innovation for development. It includes partners from Argentina, Brazil, Bulgaria, China, Croatia, India, Malaysia and South Africa and it is expected to "enhance the level of global awareness related to FLOSS development and industry, human capacity building, standards and interoperability and e-government issues in the geographical regions covered by the consortium".

Support from the Organisation internationale de la Francophonie (OIF)

82. Bridging the digital divide is among the prime concerns of the OIF. Through the Institut des nouvelles technologies de l'information et la formation (INTIF) of its Agence internationale de la Francophonie (AIF), OIF has been supporting several projects and initiatives to promote OSS. In many francophone countries in Africa, AIF has funded the establishment of ICT laboratories (LABTIC) designed inter alia to raise OSS awareness and to provide equipment, local content and training. It has co-sponsored with ECA a workshop on OSS during CODI III[152] and with the Association africaine des utilisateurs de logiciels libres (AAUL) a meeting of African OSS user groups - the Rencontres africaines des utilisateurs de logiciels libres (RALL)[153] – with the first edition (RALL 2004) held in Ouagadougou, Burkina Faso.

Multi-stakeholders partnerships, North-South and South-South cooperation

83. The philosophy behind the OSS movement builds on sharing, solidarity and cooperation. While the above projects underline the sponsorship role played by governments, contributions from private sector enterprises and CSOs are often instrumental for successful programme delivery and should be duly recognized. Within the IT industry, major players such as IBM, HP and Novell have stressed their commitment to the open source philosophy and are contributing to bridge the digital divide. Several NPOs at a global, regional or local level are also very active in promoting open source, raising awareness and/or contributing to the development and improvement of software. They include FSF, the Free Software Foundation Europe (FSFE), FOSSFA, Bridges.org, the Shuttleworth Foundation, the different users groups, etc. The Linux Professional Institute (LPI)[154] is a NPO seeking to improve the skills and resources of Linux and OSS professionals and it is best known for its skills certification examinations that are recognized worldwide.

84. As recalled in the first JIU report on OSS[155], a Japan Open Source Forum was announced during the "Japan-China-Korea Open Source Business Talks" held in Osaka in November 2003. Subsequently, it formed with the China OSS Promotion Union and the Korea OSS Promotion Forum the Northeast Asia OSS Promotion Forum "for the purpose of collaborating with private enterprises, research institutes, and

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[146] Bridges.org, "How to set up and operate a successful computer refurbishment centre in Africa: A Planning and Management Guide" (see http://www.catia.ws/Documents/Indexpage/Refurb_Centre_Guide_bridges.org.pdf).
[147] Bridges.org, "Free/open source software (FOSS) policy in Africa: A toolkit for policy-makers and practitioners" (see http://www.bridges.org/foss/FOSSPolicyToolkit_10Aug05.pdf).
[148] Open Research, "Paying the price? A Total Cost of Ownership comparison between new and refurbished PCs in the small business, NGO and school in Africa" (see http://www.catia.ws/Documents/Indexpage/TCO_Report_Open_Research_FOR_PUBLICATION.zip).
[149] Solo is a low-energy transportable computer designed to meet the needs of developing countries (see http://www.explan.co.uk/solo/index.shtml#objectives).
[150] See http://www.flossworld.org/.
[151] See http://www.intech.unu.edu/index.php.
[152] See http://smsi.francophonie.org/IMG/pdf/codi_iii_recommandation_v1-2.pdf.
[153] See http://rall.abull.bf/.
[154] See http://www.lpi.org/en/home.html.
[155] JIU/REP/2005/3, para. 68.

educational organizations"[156] from the three countries. The joint Forum held its first, second and third meetings respectively in Beijing (April 2004), in Sapporo, Japan (July 2004) and Seoul (December 2004).

85. Developing countries such as Brazil, India and South Africa have been at the forefront of efforts by Member States in promoting OSS and a very promising South-South cooperation is building up. The three countries instituted in 2004 the India-Brazil-South Africa (IBSA) Dialogue Forum that held its second meeting in Cape Town in May 2005. In the ministerial communiqué adopted at the conclusion of that meeting,[157] the foreign ministers of the three countries recognized, inter alia, that "digital exclusion constituted a critical obstacle to development" and that ICT "should be harnessed to address the needs of the poor". They "stressed the importance of cooperation in this areas, especially with regard to the availability of low-cost equipment, multi-purpose community access centres, their sustainability and Free/Libre Open Source Software (FLOSS)".[158]

86. The International Institute for Communication and Development (IICD)[159] is a non-profit foundation established in 1997 by the Netherlands Ministry for Development Cooperation with a mandate to assist developing countries to harness the potential of ICT for locally owned sustainable development in sectors such as education, environment, governance, health and livelihood opportunities. IICD has been active in nine countries (Bolivia, Burkina Faso, Ecuador, Ghana, Jamaica, Mali, Uganda, United Republic of Tanzania and Zambia) and its core resources come from the Government of the Netherlands, the British Department for International Development (DFID) and the Swiss Agency for Development and Cooperation (SDC). IICD has supported several OSS projects among which the launching of an online open source monitoring and evaluation tool,[160] the establishment of the East African Centre for Open Source Software (EACOSS)[161] - an OSS training centre based in Kampala - and numerous reports related to the use of OSS for development.

87. Goal 8 of the MDGs relates to the need to develop global partnerships to support the other development goals. The targets to be reached under that goal require inter alia, addressing the special needs of the LDCs as well as those of the land-locked small developing islands. They also call for more generous official development assistance from the donor community and for making available, "in cooperation with the private sector", the benefits of new technologies, especially the ICT. Member States and United Nations system organizations should take advantage more systematically of all the above-mentioned opportunities in devising their e-strategies and related activities, and the involvement of such partners should be envisaged from the planning phase onward.

88. While most United Nations system organizations face budgetary constraints, they could nevertheless put to better use their wide field network, their long-time experience with development issues and their recognition as knowledge organizations and centres of excellence in their specific domain of competence to sponsor or initiate multi-stakeholder partnerships such as the following:

- In locations where there are several organizations, establishment of a joint centre responsible for collecting decommissioned PCs to be either refurbished or donated to a designated NGO for refurbishing in the framework of an agreed upon project;
- Joint production of CDs containing selected OSS applications for distribution to specifically targeted users;
- Co-sponsorships of seminars, workshops and other meetings;
- Support to local OSS user groups;
- Translation of software and support to localization projects.

(recommendation 4)

[156] See http://www.ipa.go.jp/software/open/forum/NEAforum.html .
[157] See http://www.unb.br/irel/ibsa/g3docs/CapeTownMinisterialCommunique.pdf .
[158] See http://www.unb.br/irel/ibsa/g3docs/CapeTownMinisterialCommunique.pdf, para.42.
[159] See http://www.iicd.org/ .
[160] See http://www.iicd.org/articles/iicdnews-2005-05-09.87110995011/view?searchterm=open%20source .
[161] See http://www.iicd.org/projects/articles/iicdprojects-2005-04-05.3281863436 .

ANNEXES

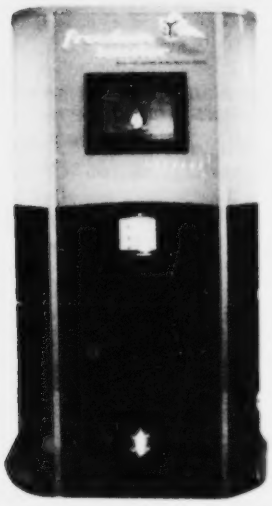
Annex 1

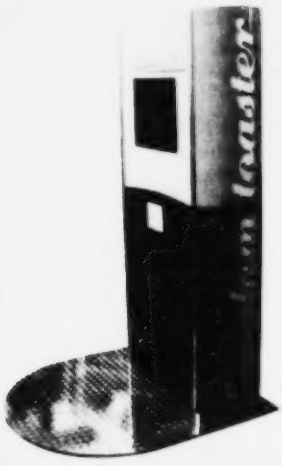
Linkages between ICT, the MDGs and OSS*

MDGs and related targets	Some indicative ICT targets where to consider OSS
Goal 1: Eradicate extreme poverty and hunger Halve, between 1990 and 2015, the proportion of people whose income is less than $1 a day; halve, between 1990 and 2015, the proportion of people who suffer from hunger.	Increase access to market information and lower transaction costs for poor farmers and traders; translate the direct benefits of using ICT into economic growth in rural and urban areas, indirectly creating more jobs in traditional sectors, such as farming and fishing.
Goal 2: Achieve universal primary education Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling.	Increase supply of trained teachers through ICT-enhanced and distance training of teachers; integrate ICT training into curriculum; improve the efficiency and effectiveness of education ministries and related bodies through strategic application of technologies and ICT enabled skill development; empower teachers at the local level through use of ICT and networks that link teachers to their colleagues; broaden availability of quality educational materials/resources through ICT, local content distribution; use of ICT to provide schooling and training, including vocational training outside of schools.
Goal 3: Promote gender equality and empower women Eliminate gender disparity in primary and secondary education preferably by 2005 and in all levels of education no later than 2015.	Deliver educational and literacy programs specifically targeted to poor girls and women using appropriate technologies; influence public opinion on gender equality through information and communication programs using a range of ICT; vocational and schooling programs targeted at girls outside traditional school environment (e.g. using community centres in villages, telecasters, etc.).
Goal 4: Reduce child mortality Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate. **Goal 5: Improve maternal health** Reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio. **Goal 6: Combat HIV/AIDS, malaria and other diseases** Have halted by 2015 and begun to reverse the spread of HIV/AIDS; have halted by 2015 and begun to reverse the incidence of malaria and other major diseases.	Increase monitoring and information-sharing on diseases; increase access to reproductive health information, including information on HIV/AIDS prevention, through locally-appropriate content in local languages; enhance delivery of basic and in-service training for health workers; increase access of rural care givers to specialist support and remote diagnosis.
Goal 7: Ensure environmental sustainability Integrate the principles of sustainable development into country policies and program and reverse the loss of environmental resources; halve, by 2015, the proportion of people without sustainable access to safe drinking water; have achieved, by 2020, a significant improvement in the lives of at least 100 million slum dwellers	Use of remote-sensing technologies and communications networks for more effective monitoring, resource management and mitigation of environmental risks e.g. GIS to combat illegal logging, illegal fishing, to help forest protection; increase access to/awareness of sustainable development strategies, in areas such as agriculture, sanitation and water management, mining, etc.; facilitate knowledge exchange and networking among policy makers, practitioners and advocacy groups.
Goal 8: Develop a global partnership for development (only some targets) Address the least developed countries' special needs; address the special needs of landlocked and small island developing States; provide more generous official development assistance for countries committed to poverty reduction; in cooperation with the private sector, make available the benefits of new technologies—especially information and communications technologies.	Include OSS in ODA programmes and in multi-stakeholders partnerships involving not only the private sector but also the buoyant OSS communities.

*Table adapted from a matrix established by the United Nations ICT Task Force (see footnote 9)

Annex II
The Freedom Toaster provides increased access to OSS applications





What is the Freedom Toaster?

It is a conveniently located, self-contained 'Bring 'n Burn' facility, developed by the Shuttleworth Foundation (http://www.shuttleworthfoundation.com/ in South Africa where users bring their own blank discs and make copies of OSS they require.

But why do we need this?

The Freedom Toaster project began as a means of overcoming the difficulty in obtaining Linux and OSS due to the restrictive telecommunications environment in South Africa, where the easy downloading of large pieces of software is just not possible

How do I use the Toaster?

Using a Freedom Toaster could not be easier. Using the touch-screen on the Toaster, you choose which software you want. On-screen information tells you more about the software you have selected, including how many CDs you will need. The Freedom Toasters also contain a host of on-screen information to teach people a little more about the world of Free and Open software. Touch the screen, browse and explore!

(Extracts from http://www.freedomtoaster.org/)